Remarks

<u>Status of application</u>

Claims 1-44 were examined and stand rejected in view of prior art and for technical (non-prior art) reasons. Applicant appreciates the Examiner's courtesy of a telephone interview to discuss the rejection of Applicant's claims in the second office action. The claims have been amended to address the objections and rejections made by the Examiner in the second office action. In view of the amendments to the claims and the below remarks, reexamination and reconsideration are respectfully requested.

<u>General</u>

A. Claim Objections

The Examiner objected to use of the word "for" followed by a verb in claims 1, 12, 23, 35, 37, 38, 43 and 44. Although Applicant does not believe that the formulation creates an intended use statement as suggested by the Examiner, in the interests of expediting prosecution, Applicant has amended these claims to address the Examiner's objection.

Similarly, claims 1 and 23 have been amended to address the Examiner's objection to phrases like "may be" and "should be", although Applicant notes that MPEP 2111.04 does not mention these terms and Applicant does not believe that they are equivalent to the "adapted to", "adapted for", "whereby" and "wherein" formulations referenced in MPEP 2111.04.

B. Rejection of claims 1, 18, 19, 23, 34 and 44 under 35 USC Section 112

The Examiner has rejected claim 1 under 35 USC Section 112, second paragraph as being indefinite as a result of use of the word "efficiently". Applicant has deleted this word in Claim 1, thereby overcoming the rejection.

The Examiner has also rejected Claims 1 and 23 (and dependents thereof) under 35 USC Section 112, second paragraph as indefinite. As to Claims 1 and 23, the Examiner states several reasons for this rejection. First, the Examiner states that the claim limitation that the lists comprise (or "includes at least") wildcard and negation information differs from the specification which does not require wildcard and negation

information. Applicant respectfully disagrees with the Examiner that the claims are required to mirror the specification or include all of its details in the claims. The limitations of lists which include wildcard information and negation information are enabled by the specification and, therefore, Applicant respectfully believes that is inclusion of these claim limitations is proper and appropriate.

The Examiner also states that the phrasing of the claims is unclear as to which claim limitations apply to the lists and which apply to the index that is built based on the list. In addition, the Examiner believes that the resolution module/steps and certain other wording used in these claims is unclear. Although Applicant disagrees with several of the points made by the Examiner in this rejection, in the interests of expediting prosecution, Applicant has proposed amendments to claims 1 and 23 in an effort to address the concerns raised by the Examiner.

In addition, claims 18, 19 and 34 stand rejected under 35 USC Section 112, second paragraph on the basis that when the word "if" is used there must also be an "else" to provide what happens when the condition is not met. Applicant has replace the word "if" with the word "when" in claims 18, 19 and 34 as suggested by the Examiner in an effort to overcome the rejection.

The Examiner has also rejected claim 44 as indefinite. Applicant has canceled claim 44.

C. Rejection of Claims 1-22 and 44 under Section 101

Claims 1-22 stand rejected on the basis of nonstatutory subject matter. Applicant has amended claim 1 to indicate the tangible result of Applicant's invention -- specifically, that a given published item may be replicated to subscribers for display to users. It is respectfully submitted that that is a useful and patentable advance over the art and that the rejection under Section 101 is overcome.

As to claims 1-22, the Examiner also rejects the claims on the basis that Applicant's claimed system constitutes computer programs representing computer listings *per se* and hence are non-statutory. However, Applicant's specification expressly states that the elements may be implemented in hardware, software or firmware (or combinations thereof). This is expressly stated, for example, at paragraph [0032] of

Applicant's specification as follows: "...the corresponding apparatus element may be configured in hardware, software, firmware or combinations thereof". Applicant has amended claim 1 to add claim limitations of a processor and memory so as to more clearly indicate that the claimed system comprises a hardware and software combination. Accordingly, as Applicant's claimed invention defines a useful machine or item of manufacture in terms of a hardware and software combination, Applicant respectfully believes that it defines a statutory product and overcomes the rejection of claims 1-22 under Section 101.

The Examiner has also rejected claim 44 on the basis of non-statutory subject matter. Applicant has canceled claim 44.

Prior art rejections

A. First Section 103 rejection: Zarmer in view of Collison

Claims 1-8, 12, 22-28, 38 and 42-44 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,625,818 to Zarmer et al. (hereinafter "Zarmer") in view of U.S. PGPub No. 2004/0139166 to Collison (hereinafter "Collison"). The Examiner's rejection of claim 1 is representative:

> As for Claim 1, Zarmer teaches:
> A system for determining subscribers to which a published item of data should be replicated, the system comprising:
> an interface module (See e.g. Zarmer - col. 5, lines 2-10 and col. 7, lines 5-10) for receiving user input of lists of a plurality of subscribers, each list specifying items of data to be replicated to a given subscriber (See e.g. Zarmer - subscribing col. 13, lines 2-10);
> a build module for building an index based on the lists of the plurality of subscribers containing comprising negation information entries indicating subscribers for each item of data specified in the lists (See e.g. Zarmer - ObjectMan can search list so it was built - col. 11, lines 12-38, can unsubscribe - col. 4, line 66- col.5, line 7 and 26-45, and RemoveInterestedView - col. 14, lines 22-27 and RemoveInterestedParties col. 28, line 65- col. 29, line 35) and a default list of subscribers for items of data not matching any of the entries (See e.g. Zarmer -auto-interest col. 22, lines 42-53); and
> a resolution module for receiving a published item of data and determining in constant time subscribers to which the published item should be replicated based on the index, so that said published item may be efficiently replicated for display to subscribers (See e.g. Zarmer -ObjectMan - col. 11, lines 12-38).

Zarmer does not teach wildcards. However, Collison teaches building entries including a wildcard for indicating all items of data of a certain type should be replicated to a subscriber (See e.g. Collison - paragraphs [0026-0031]).

Under Section 103(a), a patent may not be obtained if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. To establish a prima facie case of obviousness under this section, the Examiner must establish: (1) that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) that there is a reasonable expectation of success, and (3) that the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See e.g., MPEP 2142). As will be shown below, the reference(s) cited by the Examiner fail to meet these conditions.

The Examiner equates Zarmer's electronic publishing tool for information providers and online service operators to Applicant's system and methodology for replication subscription resolution in a distributed database environment. In a data replication environment having a set of subscribers (e.g., replicate databases) requesting different subsets of data from a data source (e.g., a primary database), Applicant's invention provides for efficiently finding all of the subscribers that should receive a copy of a particular item published by the data source (i.e., the "published item"). Zarmer's solution, in contrast, is an electronic publishing tool for use by information providers in managing content provided to online services (Zarmer, abstract). In addition to the different focus of Applicant's invention and Zarmer's system, Applicant's claimed invention includes specific elements that distinguish it from Zarmer and Collison as hereinafter described.

Applicant's invention enables subscribers (i.e., replicate databases) to define the items of data (published items) they wish to receive from a primary database, even though all of the published items to be replicated are themselves not known in advance (Applicant's specification, paragraph [0060]). Applicant's solution also allows users to define items to be received from the primary database using wildcards and negations

(Applicant's specification, paragraph [0060]). Applicant's approach provides for building an index (referred to a "name set index") based on the items requested by the subscribers (i.e., replicate databases) which is subsequently used to determine all subscribers to particular items of data (Applicant's specification, paragraph [0062]). In this manner, Applicant's invention provides a replication solution that determines, given a particular item of data published by a primary database, the particular subscribers (i.e., replicate databases) to which the item of data should be replicated. Moreover, it determines such subscribers in a search time which is not dependent on the number of subscribers or the number of items each subscriber is interested in receiving.

Zarmer provides an object management mechanism, including indexing of objects via assigned object identifiers. However, Zarmer describes a very general object management mechanism common to many data distribution systems which can essentially be considered a black box (i.e., generic), as Zarmer's particular invention itself is not tied to (and does not provide a description of) building a specific index for facilitating replication subscription resolution based on items requested by subscribers in the manner set forth in Applicant's specification and claims. This is demonstrated when one compares the specific teachings of Zarmer referenced by the Examiner to the specific features of Applicant's claimed invention.

Applicant's invention provides for building an index based on items of data requested by a plurality of subscribers (replicate databases). Moreover, as all items which may be published by the primary database are not known in advance, subscribers may define the published items of interest using wildcards and negations (Applicant's specification, paragraph [0060]). Applicant's claims have been amended to clarify these features and bring them to the forefront. For instance, Applicant's amended claim 1 includes the following claim limitations:

> an interface module which <u>receives user input of lists of a plurality of subscribers,</u> each list specifying items of data to be replicated to a given subscriber; <u>wherein said lists include wildcard information and negation information;</u>

(Applicant's amended claim 1, emphasis added)

As shown, the claim has been amended to highlight the feature that the lists of

subscribers may include wildcard and negation information. (Applicant's other independent claim has been amended in a like manner.) This is in stark contrast to prior art systems that simply index information or objects based on already-known information. The Examiner references Zarmer at col. 13, lines 2-10 for the corresponding teachings of user input of list of a plurality of subscribers. However, the referenced portion of Zarmer simply describes that objects can register interest in other objects as follows:

> Persistent objects can register interest in other persistent objects, including themselves. Registering interest in an object allows the registered object to receive any change notices generated by the object. Persistent objects should broadcast change notices to announce any significant change in its data or state. This allows other objects who have registered an interest to know when relevant data has changed.

> (Zarmer, col. 13, lines 3-10)

As illustrated above, Zarmer's approach provides for registration of interest in an existing object and does not make any mention of receiving user input of lists of items of interest. Applicant's approach, in contrast, provides for users to define, in advance, items to be replicated which may include items of data that have not yet been published. Although Applicant's system does not know the yet-to-be created information, it does know some information in the form of descriptors that indicate the sort or type of information that a given subscriber or recipient wants as well as (optionally) the sort or type of information that a given recipient does not want. These descriptors may be expressed in terms of wildcards and negation. Zarmer's approach, which relies on the objects themselves broadcasting change notices to registered listeners assumes that the persistent objects are already in existence. In addition, the Examiner acknowledges that Zarmer includes no teaching of defining lists of items of interest using wildcard and negation information and thus adds Collison for these teachings.

Turning to the specific teachings of Collison referenced by the Examiner, however, one finds that while Collison discusses the use of wildcard characters, it does not include any teaching of receiving lists of items of interest including wildcards and negations (Collison, paragraphs [0026]-[0031]). In addition, Collison does not include

the specific teachings of Applicant's claimed invention of an index based on the lists of subscribers, with one or more entries in the index including wildcards. In fact, Applicant's review of the Collison reference finds no mention whatsoever of any index (for facilitating subscription resolution or otherwise). Collison's lack of any description of using an index indicates that Collison does not contemplate or suggesting that wildcards could be directly used to build an index in the same manner as Applicant's invention. In addition, Collison makes no mention of building an index based on lists including negations. Applicant's claimed invention, in contrast, focuses on building the above-described name set index for more efficient replication subscription resolution. Applicant's claim 1, for example, includes the following claim limitations:

> a build module which builds an index based on the lists of the plurality of subscribers containing entries indicating subscribers for each item of data specified in the lists, at least one entry including a wildcard, and a default list of subscribers for items of data not matching any of the entries; and

(Applicant's amended claim 1, emphasis added)

Significantly, the index which built by Applicant's system is not a conventional index built in an ordinary database system based on one or more tables of records stored in the database system. In such database systems, conventional indexes are based on existing records been stored in the database system -- that is, based on information is "known" to the system. As discussed above, in the replication subscription situation addressed by Applicant's invention the information is not known as it does not yet exist. Therefore Applicant's index (name set index) is built based on lists of subscribers which may be defined using wildcards and negations so that the subscriber may indicate that it wishes to receive particular types of items which may be published in the future (Applicant's specification, paragraphs [0060]-[0062]). Additionally, Applicant's index also includes a default list subscribers for items of data not matching any of the index entries (Applicant's specification, paragraph [0093]). This is another aspect of Applicant's claimed invention that enables Applicant's solution to identify subscribers that are to receive particular items of data in an amount of time which is not dependent on the number of subscribers or the number of items each subscriber is interested in receiving, even when such items are not known in advance.

In contrast to Applicant's approach, Zarmer provides for objects to express interest in other <u>existing</u> objects. To the extent Zarmer includes description of an index, it appears to be a conventional index of existing objects which is organized based on an object identifier assigned to a particular object. Applicant's index, in contrast, specifically provides for inclusion of entries which include wildcards as well as a default list of subscribers to items not matching any of the index entries. As to this last point, the Examiner equates Zarmer's "auto-interest" facility to Applicant's default list of subscribers which receive items not matching any of the index entries. However, the description of Zarmer's auto interest facility makes no mention of an index or of a list of subscribers to items not matching other index entries. Rather, Zarmer's Application class receives every change notice and distributes all such change notices to a set of objects (Zarmer, col. 22, lines 42-53). Thus, it provides for distributing <u>all</u> change notices that it receives and not just those that that do not match entries in an index (as in fact, no evaluation of any index appears to be involved). Accordingly, its teachings are not comparable to those of Applicant's claimed invention.

All told, it is respectfully submitted that Applicant's approach of building an index based on wildcard and negation information that allows subscribers to items of data which are not known in advance to be efficiently determined is a patentable advance over the art. Further, in view of the above amendments further clarifying Applicant's invention (as well as clarifying remarks made above), it is respectfully submitted that the rejection under Section 103 is overcome.

B. Second Section 103 rejection: Zarmer, Collison and Pedrizetti

Claims 9-11, 13-19, 21, 29-37 and 39-40 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Zarmer (above) in view of Collison (above), further in view of Pedrizetti et al., U.S. Patent No. 6,151,708 (hereinafter Pedrizetti). Here, the Examiner repeats the rejection based on Zarmer and Collison, but adds Pedrizetti for the teaching of "a hash table of entries based on the lists of the plurality of subscribers." The claims are believed to be allowable for at least the reasons cited above pertaining to the deficiencies of the Zarmer and Collison references as to Applicant's claimed invention. Nothing in Pedrizetti cures these deficiencies of Zarmer and Collison as Pedrizetti includes no

teaching building an index based on lists of subscribers including wildcard and negation information. In view of amendments to Applicant's claims and the above remarks, it is respectfully submitted that Applicant's claimed invention distinguishes over these combined art references and overcomes any rejection under Section 103.

Any dependent claims not explicitly discussed are believed to be allowable by virtue of dependency from Applicant's independent claims, as discussed in detail above.

Conclusion

In view of the foregoing remarks and the amendment to the claims, it is believed that all claims are now in condition for allowance. Hence, it is respectfully requested that the application be passed to issue at an early date.

If for any reason the Examiner feels that a telephone conference would in any way expedite prosecution of the subject application, the Examiner is invited to telephone the undersigned at 925 465 0361.

Respectfully submitted,

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